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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/088,982	03/26/2002	Tatsunori Koyanagi	55166US006	6614

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EXAMINER

PATEL, ISHWARBHAI B

ART UNIT	PAPER NUMBER
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2827

DATE MAILED: 03/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/088,982

Applicant(s)

KOYANAGI, TATSUNORI

Examiner

Ishwar (I. B.) Patel

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 03 November 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 4 is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-7 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 03 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Drawings

1. The drawings were received on November 3, 2003. These drawings are approved.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3 and 5-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chang et al, US Patent No. 5,774,340, hereafter, Chang, in view of Taniguchi, US Patent No. 5,084,124.

Regarding claim 1 and 5, Chang discloses a multi-layer double-sided wiring board comprising:

an insulating layer having an opening formed therein; a first conductive layer formed on an upper surface of the insulating layer (redistribution structure 12 with insulating layer 28, having input / output pads 34 and lines 36 on top surface 30, see figure 1, column 2, line 25-50);

a second conductive layer formed on a lower surface of the insulating layer and covering an inside wall of the opening and a portion of the first conductive layer

Art Unit: 2827

which is exposed in the opening (conductive layer 48 along with plating layer 44 / 46 / 54, see figure 1, column 3, line 1-15);

the second conductive layer directly contacts the first conductive layer in the opening without the interface layer being interposed there between (plating layer 44 directly in contact with input / output pads 34, see figure 1);

the first and second conductive layers are materials having same conductivity (all the metal layers, including plating layer, made of copper, column 3, line 42-49), however,

fails to disclose an interface layer interposed between the insulating layer and atleast a portion of one or both of the first and second conductive layers, wherein, the interface layer contains a material different from the materials of the first and second conductive layers.

Chang is silent about the connection of the first and second conductive material with the base material 28.

Taniguchi discloses a laminate, metal foil 4 bonded to the polyimide film 1 using adhesive 2 and 3, to have excellent bonding strength, figure 1, column 2, line 20-45.

A person of ordinary skill in the art at the time the invention was made would readily recognize the advantage of using adhesive layer, from the teachings of Taniguchi, in order to have better bonding strength.

Further, the adhesive layer can be used and applied to the base layer, on only one side or both the sides depending upon the specific manufacturing method used.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the laminate of Chang, with the copper foil bonded to the base insulating material with an adhesive material, in order to have better bonding strength, to have better performance.

Additionally regarding claim 5, it is obvious to selectively remove the conductive and insulating material from the lower surface in order to have a via hole with desired structure.

Regarding claim 2, the modified structure of Chang further discloses the second conductive layer directly contacts the insulating layer at the inside wall of the opening without the interface layer being interposed there between, see Chang, figure 1.

Regarding claim 6 and 7, the modified circuit board of Chang further discloses the first and second conductive layers made of same material as claimed in claim 6 and of copper, as claimed in claim 7, Chang, column 3, line 43-49.

4. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Chang and Taniguchi, as applied to claims 1-2 and 6-7 above, and further in view of Yamanishi et al., US Patent No. 5,366,814, hereafter, Yamanishi.

Regarding claim 3, the modified circuit board of Chang further discloses all the features of the claimed invention except,

the interface layer contains at least one metallic element selected from the group consisting of nickel, cobalt, zinc, and chromium.

Yamanishi discloses varied treatment procedures on the copper foil, including treatment layer of Chromium, Nickel, Cobalt or Zinc on the surface foil to be bonded to the resin base, to impart heat resistance or other properties, column 4, line 11-35.

A person of ordinary skill in the art at the time the invention was made would readily recognize the advantage of using treatment layer of Chromium, Nickel, Cobalt or Zinc, from the teachings of Yamanishi, in order to have better bonding strength, heat resistance and other properties, to the laminate. The treatment layer can be either applied to one of the conductive layer or both of the conductive layer, depending upon the specific requirements.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to use the laminate of combination of Chang and Taniguchi, with the copper foil bonded to the base insulating material with a treatment layer of Chromium, Nickel, Cobalt or Zinc, in order to have better bonding strength, heat resistance and other desired properties, to have better performance.

Allowable Subject Matter

5. Claims 4 ~~and~~ is allowed.

6. The following is a statement of reasons for the indication of allowable subject matter:

The limitation “ forming an interface layer over an entire lower surface and selectively removing a portion of the interface layer from the upper conductive layer exposed in the opening in the insulating layer from the lower side and forming a conductive layer over the entire lower surface” in a multilayer double sided wiring board, has not been disclosed by the prior art of record.

Response to Arguments

7. Applicant's arguments with respect to claims 1-3 and 5-7 have been considered but are moot in view of the new ground(s) of rejection.

Further, no explanation for the method claims were given in the previous action, as the structure was disclosed by the applied prior arts and no specific method steps, except the selective removal of the conductive and insulating material, were there in the claims, which is obvious, in order to have the structure.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Fernandez discloses a substrate 11 with conductive material 12 adhered by an adhesive 14, figure 1.

Kitamura et al, discloses a copper foil for a printed circuit board with zinc and chromate layer formed on the copper foil.

Chiang et al., discloses an adhesion promoter layer on a metal foil.

Art Unit: 2827

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ishwar (I. B.) Patel whose telephone number is (571) 272 1933. The examiner can normally be reached on M-F (8:30 - 5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (571) 272 1957. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2827

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ibp

David A. Zarneke
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Art 2827
2/20/4